

# ESTABLISHMENT OF THE AUCKLAND MOTORWAY ALLIANCE

**Kevin Doherty**, *National Manager Professional Services, NZ Transport Agency*  
**Richard Steel**, *Project Director, Beca Infrastructure Ltd*

## ABSTRACT

Prior to the establishment of the Auckland Motorway Alliance (AMA) the NZ Transport Agency (NZTA) had progressively developed and implemented a number of models for the delivery of road asset management and maintenance services across New Zealand's state highway network. It was that experience, together with a philosophy of constantly reviewing and improving the use of contract models based on experience and advancements that led the NZTA to consider a maintenance alliance for the Auckland motorway network.

The complexity of the Auckland motorway network, its importance to the regional and national economies and planned changes to the network over the next 10 years, all contributed to the NZTA's decision to establish the AMA. The AMA, comprising NZTA, Fulton Hogan Ltd, Beca Infrastructure Ltd, Opus International Consultants Ltd and Resolve Group Ltd, commenced services on 1 October 2008. For the next ten years, the AMA will manage all network assets and execute all maintenance requirements. This paper discusses the alliance procurement approach taken by NZTA and the outcomes of that process. It also examines the impacts of the alliance model on funding arrangements as well as the modifications made to the typical project alliance pain/gain financial model to reflect the objectives of the AMA.

## 1. INTRODUCTION

### 1.1 Auckland Motorway Network



**Figure 1 – Auckland Motorway Network**

The Auckland motorway network is illustrated in Figure 1 and extends for more than 230km and has more than 50 interchanges and 170 bridges. Until October 2008 maintenance and operational management was provided through approximately 60 contracts including separate contracts for network maintenance management and physical maintenance works.

## 1.2 NZTA Development of Asset Management Contract Models

Prior to the creation of the AMA and over a period of more than 10 years, the NZTA had progressively developed and implemented a number of models for the delivery of road asset management and maintenance services across New Zealand's state highway network<sup>1,2</sup>. These are summarized in Table 1.

Contract Model	Typical Contract Structure and Application	Typical Payment Mechanism and Value	Typical Tenure
Traditional	<p>Separate but concurrent professional services, network maintenance management contracts and traditional physical works contracts. This model was applied to the Auckland motorway network until 2008.</p> <p>The NZTA operates this traditional procurement model for both small and large value contracts in areas with both constrained and plentiful supplier resources.</p>	Combination of lump sum and measure and value applied to a wide range of contract values.	3 – 5 years
Performance Based Maintenance Contracts (PSMC)	<p>The PSMC model consists of a single contract for combined professional services and physical works teams providing all the products or services associated with state highway network asset management and maintenance. The model utilises output-based contracting, relying on self-compliance by the supplier to ensure performance. There are currently 4 PSMCs operating in NZ; in the Waikato, Northland, and North Auckland areas and for the Auckland Harbour Bridge.</p> <p>A large multidiscipline company, or a consortium of companies, is required to meet the demands of a PSMC. The PSMC supplier needs to have asset management and financial management skills, the ability to form strong relationships with NZTA and stakeholders within the area they work, together with a wide range of physical works resources and experience. NZTA has limited the use of the PSMC procurement model to areas where suitable resources have been plentiful.</p>	Annual lump sum payment mechanism usually with an expenditure of more than NZ\$5M/annum	10 years
Hybrid	<p>The Hybrid model has a professional services contract and a mixed professional services and physical works contract. Like the PSMC model the Hybrid model utilises output-based contracting and relies on performance measurements, reporting and self-auditing to ensure supplier performance.</p> <p>The nature of the Hybrid procurement model lends itself to larger contracting companies able to either resource a wide range of activities, or form relationships with sub-contractors. Hybrids rely on the suppliers to build robust relationships with each other and NZTA. The supplier must also have asset management skills available to them for the short-term management of the network.</p>	Annual lump sum payment mechanism usually with an expenditure of more than NZ\$3M/annum.	3 – 5 years

**Table 1 – NZTA Contract Models for Asset Management**

<sup>1</sup> NZ Transport Agency, State Highway Maintenance Contract Proforma Manual, Issue 9 March 2009

<sup>2</sup> NZ Transport Agency, Long Term Procurement Plan, June 2005

It was the experience of these three models, together with a philosophy of constantly reviewing and improving the use of delivery models based on experience and advancements; that led the NZTA to consider a maintenance alliance for the Auckland motorway network.

## **1.4 Progression to the Alliance Model**

In the context of New Zealand's state highway network there are a number of factors that make the Auckland motorway network relatively unique.

- An annual maintenance expenditure of some NZ\$50M/annum, representing approximately 20% of NZTA's state highway maintenance budget.
- A network that serves some 1.2 million people, or some 30% of New Zealand's population, living in an area larger than London.
- A programme of capital projects that will significantly add to or modify the network maintenance requirements over the period to 2016.
- Network interfaces with four city councils; Auckland, Manukau, North Shore and Waitakere and two district councils, Rodney and Frankland, and Auckland Regional Council.
- Its importance to regional and national economic growth and performance.
- A fully operational integration of the urban arterial roads with the motorway network.

These factors indicated that the requirements for an asset management and maintenance contract for the Auckland motorway network were consistent with the success factors for major construction contract alliances, namely<sup>3</sup>:

- Numerous complex and/or unpredictable risks.
- Complex interfaces.
- Complex threats or opportunities that can only effectively be managed collectively.
- Difficult stakeholder issues.
- Tight timeframes and high likelihood of scope and/or technology change.
- High-quality outcome and performance desired but where output specifications can not be clearly defined.

A key factor that led to the NZTA's ultimate selection of the alliance model was the desire to manage the entire network with a single system view rather than trying to optimise the performance of separate elements of the system. A further key factor was the opportunity to enhance value for money outcomes through a combination of risk allocation and financial incentives linked to quality and performance outcomes. These would in turn support the desired development of a systematic and holistic approach to asset management and maintenance over the entire Auckland motorway network.

A review of asset management and maintenance contract models elsewhere indicated that although Main Roads Western Australia (MRWA) had varied two existing Term Network Contracts (TNCs) to a maintenance alliance format<sup>4</sup> there was little experience of open market procurement of a maintenance alliance for a road network.

This paper has been written to provide other road controlling authorities with an overview of several key aspects of the procurement of the AMA.

## **2. ALLIANCE PROCUREMENT**

### **2.1 Procurement Structure**

The NZTA recognized that the nature and scale of the contract combined with the substantial financial investment and commitment in senior staff was likely to limit supplier interest to the established major construction contracting and professional services organisations. The NZTA initially considered selecting their preferred alliance partners from combined contractor and professional services teams.

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<sup>3</sup> Project Alliancing Practitioners Guide, Victorian State Government, Australia, April 2006

<sup>4</sup> Long Term Road Maintenance Contracts in Western Australia, Where to after Term Network Contracts J W B Noble & R Barnsley, NZHIT & Transit NZ 8th Annual Conference 2006

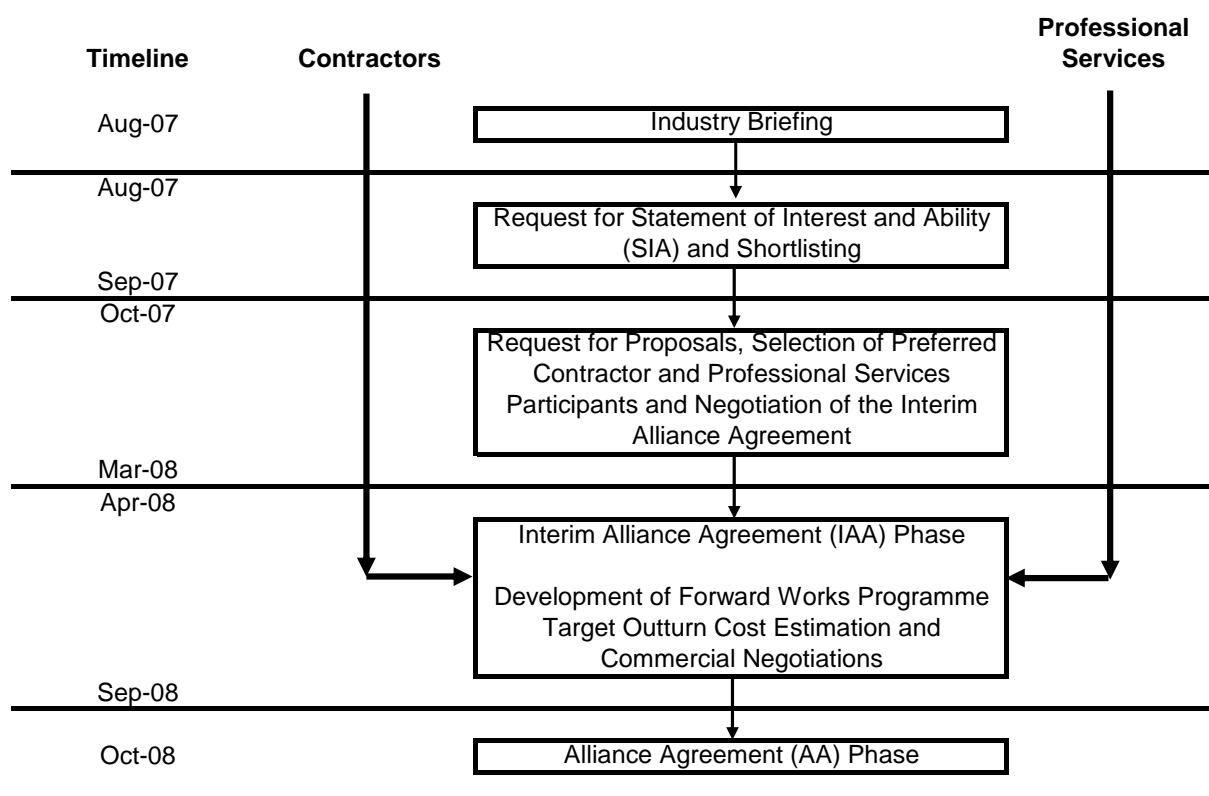
However; there was a concern that over the long term, and in the context of the New Zealand market, this approach might not yield the strongest possible combination of contractor and professional services supplier.

Consequently, given the desire to select the strongest possible combination of construction contractor and professional services suppliers, and given overseas experience where this had been successful, the NZTA decided to run separate procurement processes for the construction contractor and professional services participants.

There was also a desire to tangibly demonstrate value for money from the procurement process. This led to a need to design an effective mechanism to incorporate some price competition while retaining the attributes of the alliance model. For those reasons NZTA decided that the alliance procurement process should also include price competitiveness. This decision was underpinned by the fact that extensive information about the motorway asset, its condition, performance and maintenance history could be made available to tenderers.

## 2.2 Procurement Process

Prior to the commencement of the procurement process in August 2007 the NZTA had taken nearly a year examining options, engaging with the construction and consulting industries and obtaining Board approvals and the like. Figure 2 illustrates the procurement process and timeframe from August 2007.



**Figure 2 – AMA Procurement Process**

The separate selection processes for construction contractor and professional services suppliers, combined with price competitive elements, was designed to achieve the objectives to select the strongest participant in each industry and to capture value for money at the procurement stage. However the professional services market did not react entirely as expected and only one professional services consortium submitted a Statement of Interest and Ability (SIA). While this did not lead to the abandonment of the procurement process it did require considerable effort on the part of both the NZTA and the professional services consortium to reach agreement to proceed at the proposal stage.

Another key issue associated with the procurement process was the consequent delay in the formation of the alliance team until the start of the Interim Alliance (IAA) phase. This meant that the

combined team had not developed the psychological and cultural foundation that is a key enabler of high performance in alliance teams. This latter issue was recognized as a risk by the NZTA and mitigation actions included the appointment of a senior NZTA manager as the Alliance Director at the proposal stage and provision for three facilitated alliancing workshops during the IAA phase.

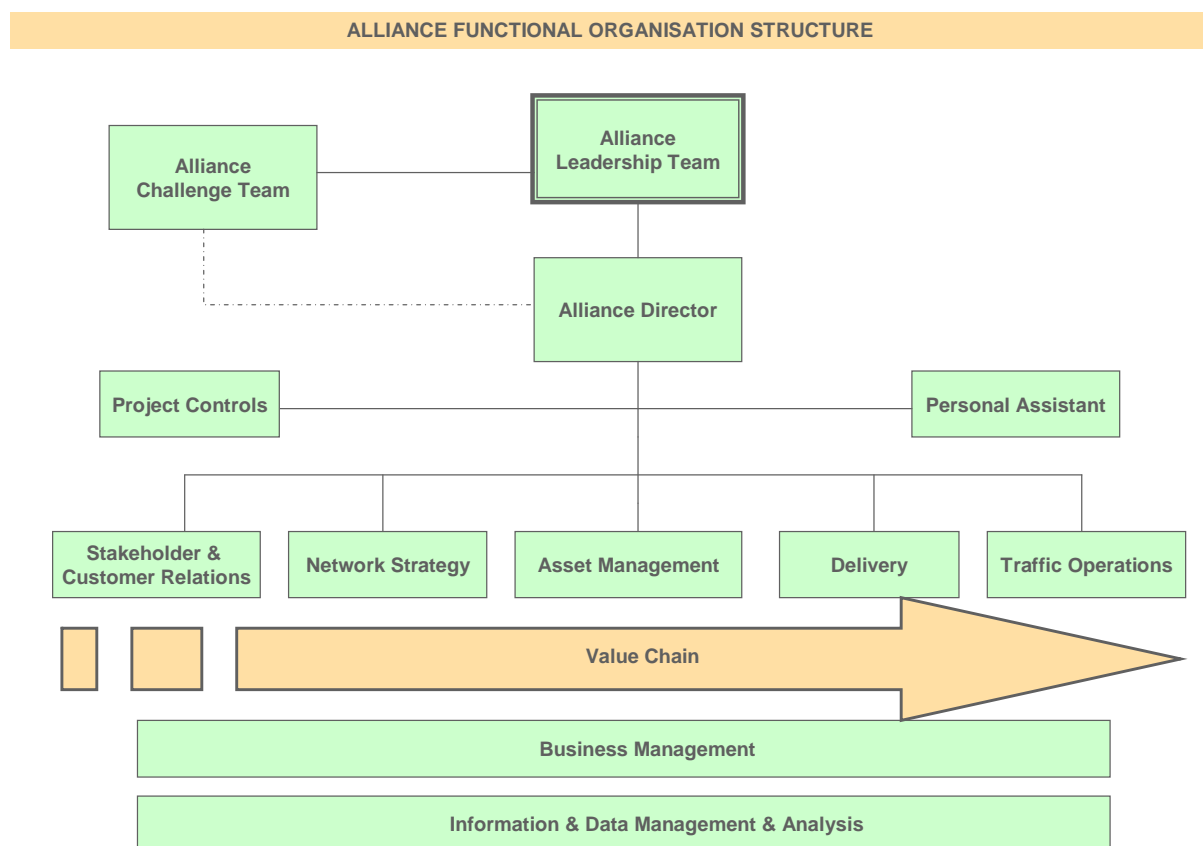
The IAA phase activities were predominately focused on developing a Target Outturn Cost (TOC), Forward Works Programme (FWP) and the organizational structure together with commercial terms and conditions for the Alliance Agreement (AA) phase. Important commercial issues included;

- the financial model and the sharing of financial risk and reward,
- the allocation of risk and
- the funding model and the provisions for release points.

The remaining sections of this paper discuss the organizational structure and the above three commercial issues.

### 3. AMA ORGANISATIONAL STRUCTURE

The development of the AMA organizational structure was based on creating a “value chain” within the organization. Each functional area had to form part of and therefore contribute to the overall value chain. Figure 3 illustrates the organizational structure.



**Figure 3 – AMA Organisational Structure**

The organisational structure was developed from a one page strategy map that linked the AMA’s purpose with higher level organisational objectives. This then led to the shaping of the functional structure and value chain approach.

Each Business unit within the AMA organizational structure is outlined below, with a brief description of the key objectives for each functional group

- **Stakeholder and Customer Relationships**  
To proactively engage, understand and inform the stakeholder and customers, ensuring that the AMA is responsive to Customer and Stakeholders with respect to service levels.
- **Network Strategy**  
To provide the strategy for achieving the vision of the AMA and to translate that strategy into action through the development of work programmes in the specific areas of road safety, environmental and sustainability issues, innovation and network controls.
- **Asset Management**  
To provide asset management and forward work planning inputs across the various asset groups (e.g. pavements, structures, stormwater), plus the development of the necessary asset management and annual plans.
- **Delivery**  
To undertake the physical activities on the network and to facilitate the necessary designs for work identified by the asset management team.
- **Traffic Operations**  
To maximize the efficient use of the network, including the management of the ITS operations, and maintenance of the ITS on-road assets
- **Business Management**  
To supply the necessary business support including Quality Assurance, Accounting, Health and Safety and Information Technology, to run the AMA
- **Information and Data Management**  
To ensure that all aspects of the AMA have access to timely and quality information upon which to make decisions. This includes GIS and advanced data analytical skills.

The Information and Data Management unit was an underpinning service to all other functional units and the understanding of its critical importance to strategic planning and the long term success of the AMA grew as the IAA progressed.

The structure finalised at the end of the IAA phase had some 68 core Full Time Equivalent (FTE) staff drawn from the construction contractor and professional services consortia and including 10 NZTA staff one of whom was the Alliance Director.

## **4. ALLIANCE PERFORMANCE MODELS**

### **4.1 Financial Model Structure**

The AMA financial model has three “Limbs” and is similar in concept to typical financial models for project alliances

- Limb 1: Direct costs
- Limb 2: Profit and corporate overhead costs
- Limb 3: Performance based payments

Estimates of Limb 1 costs were prepared at the IAA stage, and were combined with the associated Limb 2 costs to determine the Target Outturn Cost (TOC). For reasons that are explained under section 6 the AMA has 3 TOC periods and the IAA phase estimates were prepared for the first TOC period only.

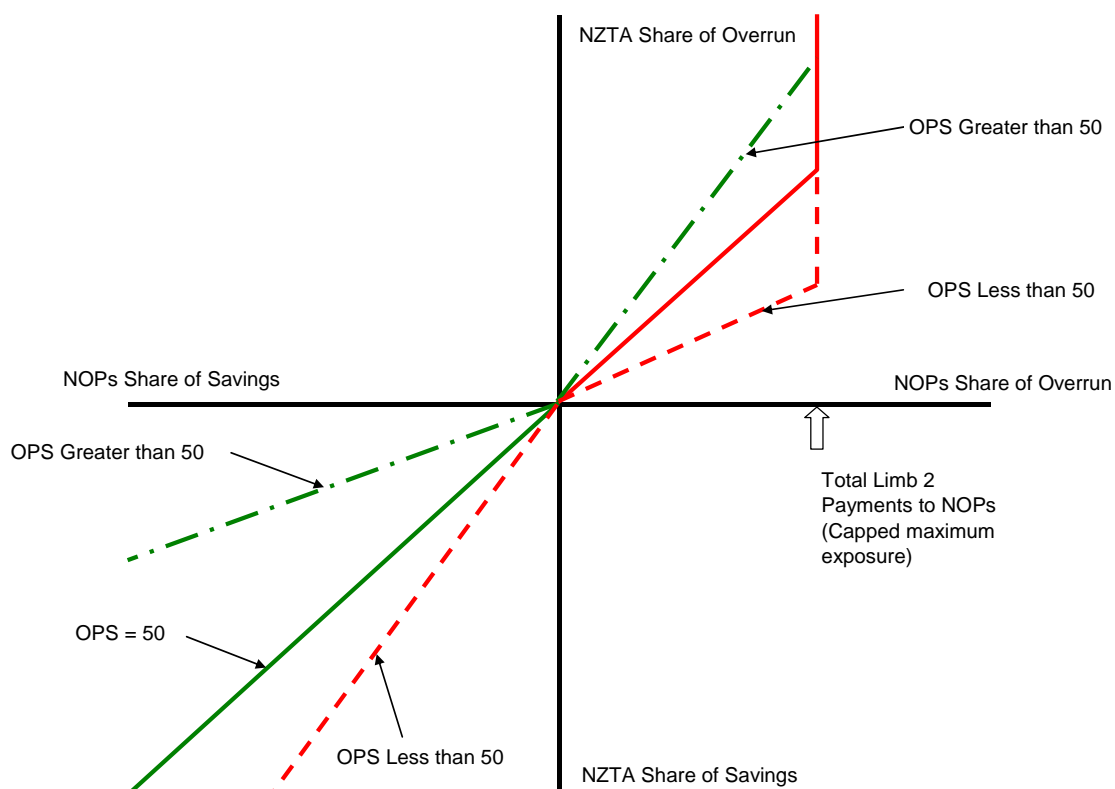
The Limb 3 performance based payments have two components and these are explained in sections 4.2 and 4.3 as follows.

### **4.2 Cost Performance Model**

For the cost performance component the distribution of financial pain and gain between the NZTA, as the owner, and the Non Owner Participants (NOPs) is a function of the non cost performance and Actual Outturn Cost (AOC) compared to the TOC. The non cost performance is based on an “Overall Performance Score” (OPS) which is explained in section 4.3. The cost performance model is illustrated in Figure 4 and shows how the sharing of pain or gain is modified by the OPS score.

In a project alliance the operation of the pain/gain share aspects of the cost performance model are relatively easy to manage. In essence financial gain is realized through delivering the agreed performance based project outcomes at an AOC less than the TOC. This can incentivize a reduction in the quantities of work executed, provided the performance based project outcomes are not compromised. For the AMA it was considered inappropriate for the NOPs to benefit from doing less maintenance work.

The alliance agreement therefore specifically requires that reduced quantities of work are either recognized as a change in project requirements and a reduction in the TOC or the funds can be reallocated within the TOC on the basis of an agreed business case. Thus the gain share aspects of the cost performance model are driven entirely by actual cost savings, in the execution of the Forward Works Programme (FWP) that is agreed as the basis for the TOC, through improved efficiency and productivity.



**Figure 4 – AMA Cost Performance Model (shows modification for indicative OPS score)**

#### 4.3 Non Cost Performance Model

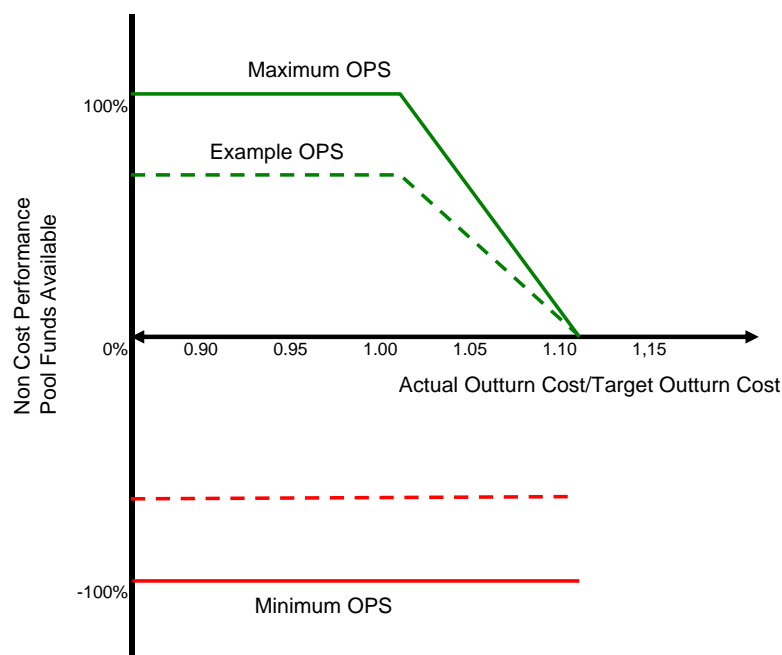
For the non cost performance component the payment is based on an AOC threshold and performance is measured against Key Result Area (KRAs) to derive the OPS. An OPS of 50 is defined as “Business as Usual”. An amount is payable to the NOPs when the AOC/TOC ratio is less than 1.1 and when the OPS is greater than 50. An amount is paid to the NZTA where the OPS is less than 50. The non cost performance model is illustrated in Figure 5.

A suite of KRAs with supporting Key Performance Indicators (KPIs) were developed during the IAA phase and are subject to further refinement and development through the tenure of the alliance agreement. The performance in each KRA is calculated on an annual basis, and measured against the KPIs, and contributes to an Overall Performance Score (OPS). The KRA framework and KPIs are weighted on an agreed basis. The OPS for the TOC period is calculated by averaging the annual OPS scores. The KRAs and KPIs established during the IAA phase are summarised in Table 2. The Alliance Leadership Team (ALT) has the power under the Alliance Agreement to modify the weightings given in Table 2 and may revise KPIs and targets over time.

The alliance participants agreed the value of the non cost performance pool that was the basis of reward or penalty payments based on the OPS. For the first TOC period the value of the non cost performance pool was set at approximately 1.2% of the TOC.

Key Result Area	Key Performance Indicators
Maximising Network Efficiency (33.7%)	(i) Safe Travel, (ii) Reliability, (iii) Optimised Throughput
Customer and Stakeholder Driven Organisation (17.9%)	(i) Engaged, (ii) Satisfied
Positive Legacy (23.0%)	(i) Asset Condition, (ii) Network Contribution
Value for Money (17.2%)	(i) Value for Money Process or Initiatives Accepted, (ii) Value for Money Equation
Healthy Organisation (8.2%)	(i) Alliance safety, (ii) Wellness

**Table 2 – Key Result Areas and Key Performance Indicators**



**Figure 5 - AMA Non Cost Performance Model**



#### 4.4 Alternative Financial Model

As stated previously the AMA's financial model is similar in structure to a typical project alliance and scenario modeling indicated that cost savings, even though limited to efficiency and productivity gains, could still dominate the Limb 3 rewards to the NOPs. This reflects the NZTA's strong "value for money" objective for the maintenance alliance concept. To some extent this issue is addressed by the modification to the pain share/gain share equation through the OPS score. The influence of the OPS score is such that the NOPs are penalised for reducing KRA performance through cost savings.

However; the potential gain share for the NOPs is still dominated by potential efficiency and productivity savings and the incentive to reduce expenditure tends to work against initiatives to enhance whole of life benefits. During the IAA phase some consideration was given to an alternative cost performance model.

The alternative model considered operates on the basis of optimizing actual outputs and performance, as measured against the KRAs identified under section 4.3, with the inclusion of additional KRAs for the FWP and TOC. This approach is similar to industrial facilities maintenance contracts where there is "no pain" for the service provider but all profit is linked to KRAs. The incentive under this model works to utilize the full amount of the available budget and apply cost savings to maximizing outputs and non cost performance.

Under the alliance agreement modifications to the AMA's financial model can be agreed by the Alliance Leadership Team (ALT) which includes the NZTA. The alternative model may be reconsidered for the subsequent TOC periods.

### 5. ALLIANCE RISK ALLOCATION

#### 5.1 Risk Allocation

A key determinant in the decision to adopt an alliance model for the Auckland motorway network was the ability to manage a wide range of risks through an integrated team approach. Table 3 summarises the risk allocation principles for the AMA.

NZTA (Owner) Risks	Alliance Risks
Escalation, legislation and policy changes and changes to the contract scope.	All other risks including labour disputes, damage from weather and climate change related events, damage from accidents, changes in traffic composition and patterns of movement, increases in traffic growth, and errors or omissions in the FWP.

**Table 3 – AMA Risk Allocation**

The cost of escalation was a risk that remained with NZTA and outside the TOC. This approach reflected the volatile nature of escalation in the period leading up to the commencement of the AMA.

The only areas of uncertainty regarding the allocation of risk related to extreme natural events and private legal action brought against NZTA in relation to statutory obligations.

Within in this context of risk allocation an extensive risk assessment exercise was completed during the IAA phase. It became apparent that risks could be broadly characterised into two categories:

- risks related to the FWP and the potential need to execute maintenance interventions earlier than planned – and referred to as "programme risks", and
- other operational risks where occurrence could be random – and referred to as "uncertain risks"

These two categories of risk were dealt with differently in the TOC build up and overall funding model.

## **5.2 Risk Adjustments to the TOC**

When finalising the TOC, the assessed risk was split between uncertain risk which is allowed for within the TOC, and programme risk which is treated as a virtual pool outside of the TOC. This model was adopted because the majority of the assessed risk related to the potential need to re-programme major parcels of work (e.g. pavement rehabilitations) into or out of the current TOC period.

If programme risk is realised then, under this approach, the FWP is reviewed to determine which items can be deferred until the next TOC period and substituted by the programme risk event. In some cases an adjustment may have to be made to the KRA's and the Level of Service (LoS) offered by the AMA, this will be a decision made by the ALT. This approach was taken because it reflected needs based asset management practices and avoided having a more conservative FWP and TOC than was deemed necessary.

In the case of uncertain risk, it is unlikely that any adjustment will be made to the TOC or the KRA's or level of services unless the event far exceeds the allowed risk amount.

The preceding discussion on the AMA's financial model (section 4) and risk allocation (section 5) are reflected in the TOC structure and funding arrangements for the AMA that is described in section 6.

## **6. ALLIANCE TARGET OUTTURN COST (TOC) AND FUNDING MODEL**

### **6.1 Provision for Three TOC Periods**

As indicated in section 5 a significant risk to successful asset management is a change at a policy, funding or political level. The degree of flexibility to deal with such changes varies with procurement model.

In terms of NZTA's existing procurement models discussed under section 1.2, the Traditional model allows more flexibility than either the Hybrid or PSMC. In letting a long-term, lump-sum contract such as a 10 year PSMC, there is a contractual expectation that the level of funding required to meet level of service performance targets will be maintained throughout the contract period.

However any drop in the funding received by the NZTA may result in a level of service reduction and a need to make a significant variation to the contract. The shorter the contract term and less risk transfer, the easier it is to vary the contract to meet any new funding or policy requirements.

During the proposal stage of the procurement process the NZTA had signaled its intention to include potential release points in the proposed 10 year tenure for the alliance. The objective of this provision was to help manage the risk of change at a policy, funding or political level. To achieve this objective, and to provide the best possible alignment with the Government's rolling 3 year financial planning cycle, two intermediate release points were introduced into the overall 10 year period of tenure.

Consistent with this approach there is provision within the alliance agreement for three Target Outturn Cost (TOC) periods.

- TOC 1 – estimated and optimized against level of service requirements and the available budget identified by the NZTA during the IAA. The TOC estimate was in the main based upon unit rates submitted as part of the price competitive component at the proposal stage. The cost estimate was also subject to review by an Independent Estimator.
- TOC 2 – to be estimated and optimized against reset level of service requirements and the available budget for TOC 2, and agreed at least 4 months prior to the expiry of TOC 1.
- TOC 3 – to be estimated and optimized against reset level of service requirements and the available budget for TOC 3, and agreed at least 4 months prior to the expiry of TOC 2.

In the event of failure to agree the budgets or level of service requirements the NZTA has the option to terminate the alliance agreement at the completion date for TOC 1 or TOC 2.

## 6.2 Influence of Three TOC periods on Whole of Life Decision Making

Conventional project alliances have a single TOC period and within in the single TOC concept there is a significant financial driver for the alliance partners to develop and implement innovations that will deliver benefits within the TOC period. A single 10 year TOC period for the AMA would have similarly provided a significant driver to develop and deliver innovations that would realize benefits within the 10 year period. Such a driver would be consistent with long term asset management strategies.

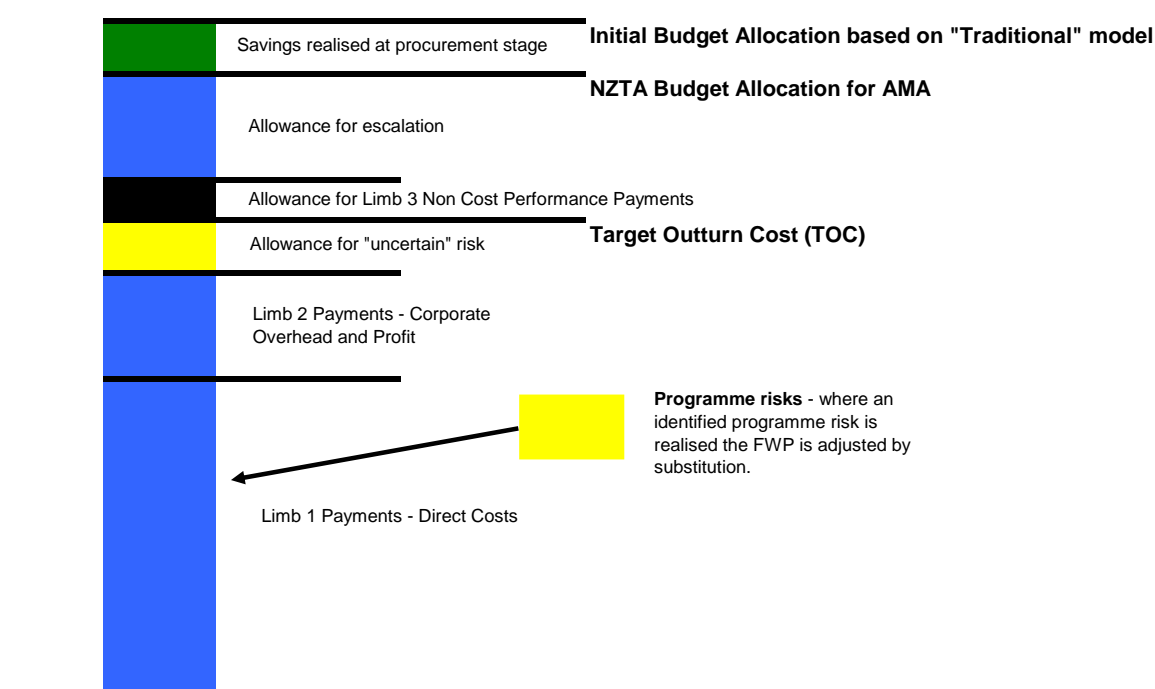
The 3 TOC periods adopted for the AMA and defined in section 6.1 tend to work against the potential to realize whole of life benefits. As discussed under section 4.4 the alliance reward structure tends to focus attention on innovations that will deliver cost savings within the duration of the TOC period and this driver was consistent with NZTA's need for a tangible demonstration of value for money and desire to retain break points in the Alliance Agreement.

This was mitigated to some extent by the NZTA representation on the ALT. In addition the Key Result Area framework and the associated non cost performance related payments discussed under section 4.3 do provide some incentive for innovations that realize benefits outside of the TOC period in which they are implemented.

## 6.3 Overall Funding Model

The overall funding model illustrated in Figure 6 shows the breakdown of the NZTA's total budget allocation for the AMA and how programme and uncertain risks identified under section 5.2 are addressed in the context of the overall funding provision.

The illustration also shows that the NZTA originally budgeted for the AMA on the basis of "business as usual" experience under the earlier Traditional contract model and as a result of the competitive alliance approach achieved savings during the procurement process.



**Figure 6 – AMA Total Funding Requirement Including Risk and Escalation**

It is important to note that this model of overall budgeting and TOC build up, and the approach to risk, results in a requirement for very detailed output records and related financial information in terms of work executed and costs. Only with a detailed understanding of activity costs and productivity is it possible to make TOC and FWP adjustments over the course of the TOC period and to reconcile those adjustments with the AOC and hence determine the cost performance (pain/gain) of the AMA.

It is also important to note that under the Alliance Agreement the AMA also has an obligation to manage the total overall cost of the AMA within the NZTA's Budget Allocation. In the event that costs are forecast to exceed the budget allocation the NZTA may seek additional funding or alternatively the AMA will be required to make FWP or level of services adjustments to contain costs within the budget allocation. This could lead to adjustments to KRA/KPI targets if significant adjustments were required.

## **7. CONCLUSIONS**

The establishment of the AMA has provided the NZTA and the other participants with valuable experience and insight into the challenges of applying and modifying project alliance models to the needs of a road network maintenance contract. Key conclusions from this experience are:

- As with project alliances, all Participants (including the NZTA) have necessarily committed senior staff resources and invested significantly during the establishment process. The level of commitment and investment required and the unique nature of the Auckland motorway network indicates that considerable care will be needed in selecting network areas that the NZTA may consider for any future maintenance alliance.
- The split procurement process for construction contractors and professional services suppliers revealed unexpected weaknesses in the professional services sector when only one consortia submitted a Statement of Interest and Ability. However the NZTA considers that it did eventually secure the best available team for the AMA and at the conclusion of the procurement process a saving against the original budget allocation (based on the Traditional procurement model) had been realized.
- The value chain concept that emerged during the IAA phase and that is embodied in the alliance functional organization structure helped to deliver a robust FWP and TOC and contributed to the development of the approach to categorizing programme and uncertain risks that is described in this paper.
- The project alliance performance models that formed part of the original Request for Proposals were modified to provide drivers that were more aligned to the objectives for the AMA. However their effectiveness in driving desired behaviours will not be known until the first TOC period is nearing its completion in 2012. It is in this area that the authors believe further development can and will occur.
- The concept of three release points and TOC periods over the 10 year tenure of the AMA has provided the opportunity to reset level of service requirements and adapt to changes in policy or funding. However the cost performance model then drives the search for innovations that will deliver benefits within the TOC period and it remains to be seen whether the KRA framework and non cost performance rewards are sufficient to stimulate long term asset management decision making.

The AMA commenced operations on 1 October 2008 and it is too early in its life to express any opinion on whether or not it is meeting the expectations of the NZTA as the owner or the wider stakeholder and user community. For that reason this paper has dealt solely with the establishment of the AMA.